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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,806	09/26/2003	Takeshi Doi	16869G-088000US	6872

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EXAMINER

FIGUEROA, NATALIA

ART UNIT

PAPER NUMBER

2651

DATE MAILED: 11/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/671,806

Applicant(s)

DOI ET AL.

Examiner

Natalia Figueroa

Art Unit

2651

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 01/20/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on January 20, 2004 (01/20/2004) is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims ~~1-5, 7-9 and 11-17~~ ^{1-5, 7-9 and 11-17} are rejected under 35 U.S.C. 102(e) as being anticipated by Suzuki et al (USPN 6,798,598), hereinafter Suzuki.

Regarding claim 1, Suzuki discloses a method of controlling a write current in a magnetic disk drive (abstract, fig.3 and col. 1, lines 14-18), the method comprising receiving a write command to initiate a present write operation (col. 6, lines 61-63); and if a predetermined period of time has elapsed since a most recent write operation terminated, applying a given write current to a write head coil at the beginning of the present write operation (col. 3, lines 29-30 and col. 4, lines 52-61), and decreasing the write current during the present write operation wherein the write current is less than the given write current at the end of the write operation (col. 4, line 62-col.5, line 10); or if said predetermined period of time has not elapsed since the most recent write

operation terminated, applying a write current less than the given write current at the beginning of the present write operation (col.7, lines 42-51).

Regarding claim 2, Suzuki discloses a method of controlling a write current in a magnetic disk drive (abstract, fig.3 and col. 1, lines 14-18), the method comprising receiving a write command to initiate a present write operation (col. 6, lines 61-63); and if a predetermined period of time has elapsed since a most recent write operation terminated, applying a first write current to a write head coil during a first portion of the present write operation (col. 3, lines 29-30 and col. 4, lines 52-61), and applying a second write current during a second later portion of the present write operation, wherein the first write current is higher than the second write current (col. 4, line 62-col.5, line 10); or if said predetermined period of time has not elapsed since a most recent write operation terminated, applying the second write current during the first and second portions of the present write operation (col.7, lines 42-51).

Regarding claim 3, Suzuki further discloses a transition between the first and second write currents is a smooth transition with a plurality of intermediate write currents (or added overshoot current to an existing nominal current, col. 5, lines 49-58).

Regarding claim 4, Suzuki further discloses that the first and second write currents are maintained at respective constants levels during the first and second portions of the write operation (or nominal current at the beginning sectors, fig. 5 and col. 4-line 58-col. 5, line 10

Regarding claim 5, Suzuki further discloses that the first write current is achieved by increasing an amount of overshoot during the first portion of the write operation relative to the amount of overshoot during the second portion of the time interval (or transitions col. 4, line58-col. 5, line 20).

Regarding claim 7 Suzuki further discloses that the write current applied to the write head coil is specified by a register value (col. 7, lines 42-51); and the register value is set to specify the first write current after said predetermined period of time has elapsed (col. 7, lines 42-51)

Regarding claim 8, Suzuki discloses a method of controlling a write current in a magnetic disk drive (abstract, fig.3 and col. 1, lines 14-18), the write current being supplied to a write head coil when information targeted for storage is divided into specified segments and is written onto a magnetic disk medium (or transitions col. 5, lines 39-48), wherein a larger write current at the beginning of writing than at the end of writing is used when the information is written after the elapse of a predetermined period of time subsequently to the end of the last writing, and substantially the same write current at the beginning of writing as at the end of writing is used when the information is written within a predetermined period of time after the start of writing (col. 4, line58-col. 5, line 20).

Regarding claim 9, Suzuki further discloses that the write current is increased or decreased by increasing or decreasing an amount of overshoot (col. 4, line58-col. 5, line 20).

Regarding claim 11, Suzuki discloses a magnetic disk drive comprising a magnetic disk that rotates during operation (fig. 3 and col. 3, lines 34-36); a write head having a coil through which a write current is passed during a write operation (col. 3, lines 29-31), and a write current control circuit that causes said write current to decrease during a write operation so that for an initial portion of the write operation, the write current is higher than the write current for an ending portion of the write operation (col. 4, line58-col. 5, line 20).

Regarding claim 12, Suzuki further discloses that the initial portion is defined by

a predetermined number of sectors (col. 5, lines 39-43).

Regarding claim 13, Suzuki further discloses that the write current decreases as a smooth function during the write operation (or overshoot current added to already nominal current, col. 5, lines 49-58).

Regarding claim 14, Suzuki further discloses the write current is held at a first value for a first portion of the write operation and then at a second, lower value following the first portion of the write operation (col. 4, line58-col. 5, line 20).

Regarding claim 15, Suzuki discloses a magnetic disk drive using a magnetic head for energizing a coil (abstract, fig.3 and col. 1, lines 14-18) when information targeted for storage is divided into specified segments and is written onto a magnetic disk medium (or transitions col. 5, lines 39-48), wherein said magnetic disk drive has a function of setting the value of write current to be supplied to the coil for each of said specified segments and records a information while varying the write current during a writing sequence (col. 4, line58-col. 5, line 20).

Regarding claim 16, Suzuki further discloses that said specified segments are sectors (col. 5, lines 39-43).

Regarding claim 17, Suzuki further discloses that said magnetic disk drive has a function of setting an overshoot instead of setting said write current and records the information at various settings for said write current by varying the overshoot (col. 4, line58-col. 5, line 20 and col. 5, 49-58).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 6 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Gaertner et al (USN 6,445,531), hereinafter Gaertner.

Regarding claims 6 and 10, Suzuki is relied upon for the same reasons of rejection as stated above. Suzuki fails to explicitly teach that said predetermined period of time after the start of writing is between several tens of microseconds and millisecond.

However, Gaertner disclose such on (col. 5, lines 3-8 and lines 46-60). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method as disclosed by Suzuki with the above teachings from Gaertner to include means to time and count the time of an operation in terms of microseconds and milliseconds, hence obtaining faster results and response for the write current controller to adjust the current being supplied to the write head as appropriate.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following documents are cited to further show the state of the art with respect to current control in disk drives.

a) Ishii (JP Pub. 2000-048312): Discloses a current controlling means for a magnetic disk device.

b) Lee (USPN 6,118,614): Discloses optimizing the write current in a magnetic disk recording device.

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c) Christensen et al (JP Pub. 08-096309): Discloses a write current selecting means for a data storage device.

d) Yun (USPN 6,175,456): Discloses controlling the write current of a magnetic disk.


7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Natalia Figueroa whose telephone number is (703) 305-1260.

The examiner can normally be reached on Monday - Thursday 8:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh N. Tran can be reached on (703) 305-4040. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


NFM


SINH TRAN
PRIMARY EXAMINER